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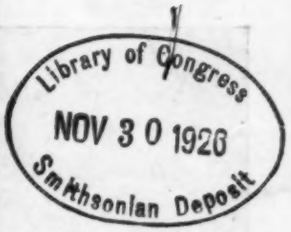
"Work a *Pleasure* for this Gang"



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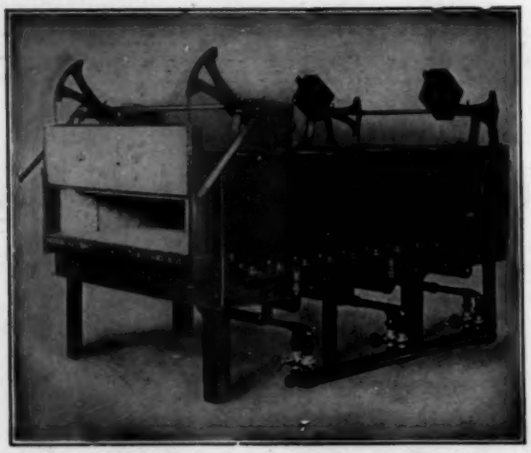

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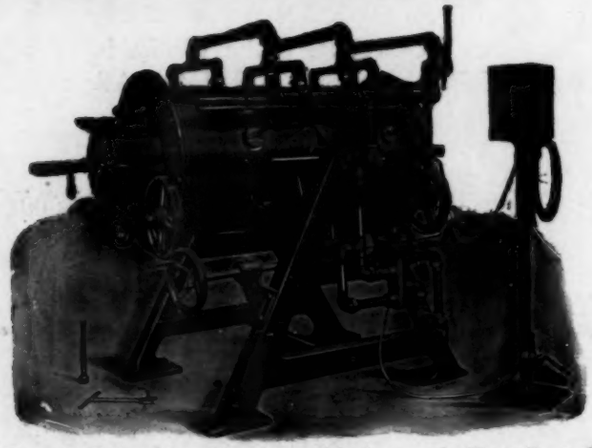

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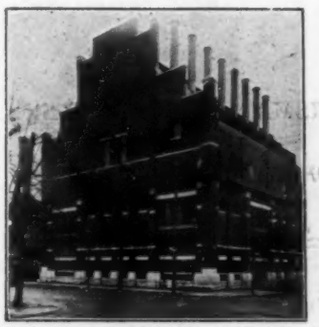

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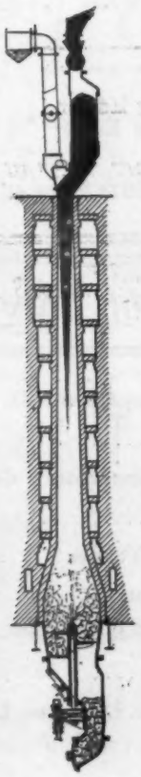

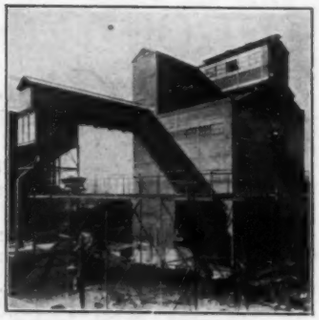

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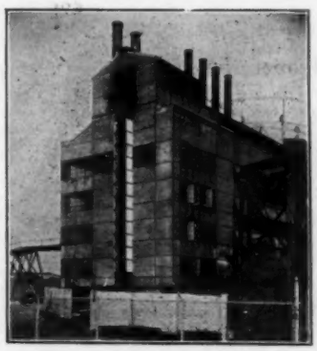

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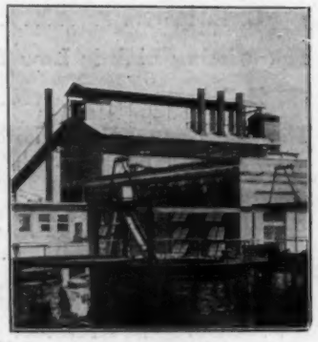

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SIXTY-SEVENTH YEAR

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Office Methods in Gas Companies*

VI. Deposit procedure

G. L. Harris

PROBABLY no one subject has been discussed so extensively in connection with public relations as the deposit policy of the gas company. An entire article could be devoted to showing why deposits should be required, and another article could be devoted to showing why deposits are unnecessary. Neither would give a true picture of things as they are or as they should be.

It is not our purpose to set forth an ideal deposit policy. There is no such policy. Rather shall we point out briefly the present tendency in deposit matters, and shall deal in detail with the office methods of handling the deposit cards.

The last five years have developed a distinctly liberal tendency as to requiring and refunding deposits. Some gas companies, indeed, have entirely eliminated the deposit requirement. But this is a radical step, and we would indeed hesitate to recommend it.

The truth of the matter is that when we place a gas meter in a customer's residence, we are selling him gas on credit. We are actually trusting him for two months' gas service, because the ordinary collection routine in the case of an unpaid bill requires practically a month before we shut off the service for non-payment.

Gas Company Entitled to Protection

Since this is so, the gas company is entitled to have the same protection as any other business which sells goods on credit. The department store, for example, obtains credit references before it sells goods on a thirty-day credit basis. If these references are not satisfactory, the credit is simply not allowed.

The gas company should grant the customer equally as fair a credit privilege as does the department store. The initial request for a deposit should not be an arbitrary demand, and if the customer presents satisfactory credit references, his credit should be as easily established as in the department store.

The question of guarantors enters here. There are many angles to this question. In fact each individual case presents a separate problem which can best be settled on its individual merits. One thing is certain, however. The guarantor should be notified immediately if the customer does not pay his bills with promptness.

Refunding Deposits

The gas company usually refunds a deposit, with interest, after the customer has used service for a sufficient period to show that he is a satisfactory credit risk. This is an excellent good-will medium. The customer appreciates it, for it makes the company seem human.

Accompanying the refund there should be a form letter, but a letter which is typed as an original letter in each case. It should be carefully composed, and it should of course be changed at frequent intervals. Otherwise the individuality of the letter is lost, because sooner or later customers will compare letters.

Refunds must of course not be made indiscriminately, just because the customer has paid his bills regularly for a certain period. Some people pay their bills because they know they have to do so. We must remember, as has been pointed out before in these articles, that although we want our customers' good-will, we must first of all protect the interests of our company.

A Suggested Deposit Policy

We repeat that we cannot pretend to be able to set up an ideal deposit policy, but we do wish to

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* *This is the sixth article by Mr. Harris on the general subject of office methods in the gas industry. The seventh article will appear next month. Editor.*

include here an outline of the policy of one company which we believe approaches the ideal both of fairness to the customer and protection to the company. This statement of policy is presented to the counter-men, and each man is thoroughly drilled in it. After all, it is the counter-man who must daily interpret the deposit policy to the customers. In the last analysis he is the credit representative of the company. He must decide when a deposit shall be required, and how much the deposit shall be. He must, therefore, be trained to judge character; and he should know also the character of certain districts of the city. In many cases the credit worth of people can be judged by the part of the city in which they live.

The deposit policy which we wish to present is as follows:

"The following rules are generally applicable in considering deposits and the granting of credit:"

1. The usual deposit required of a residence customer is $5.00 for each meter. This applies to actual residences, not to boarding houses and rooming houses; and the counter-man should ascertain if the residence is intended for any such commercial purpose. A knowledge of the city will usually enable the counter-man to recognize potential boarding house addresses.

2. All business services require ample deposits. This is especially true of restaurants, clothes-pressing places, garages, etc.

3. Alleged ownership of a home is not sufficient credit reference in itself. It should be supplemented by a regular credit report on the customer.

Regular and Prompt Payment Important Credit Reference

4. Regular and prompt payment of bills for a period of one year is important credit reference in considering the refund of an ordinary residence deposit. The payment of bills should, however, be verified before the deposit is refunded.

5. All temporary service applications require ample deposits.

6. Present customers, in moving from one address to another, are not required to make a deposit, unless they increase the number of meters they are using.

7. The same deposit is required on a prepayment gas meter as on a straight gas meter. This is necessary in order to protect the company in the event of damage to the meter, and to insure the collection of the full amount of the minimum service charge.

"This statement of company policy is brief, and it is not expected that any counter-man, merely by studying these instructions, will become capable of passing on all cases coming before him. These instructions are supplemented by group discussion in the regular counter-men's meetings, where questions as to deposit and credit policy must of necessity be constantly arising."

Deposit Records

There is no doubt that it would be unwise to ask for a deposit from certain customers. Such customers are usually those whose friendship is of most value to the company. This is why we have not laid down any hard and fast rules as to requiring deposits.

But the manner of recording deposits, of making refunds, and of deposit accounting procedure can be very definitely provided for, and it is extremely important that definite rules be made. There must be instantly accessible, absolutely accurate, up-to-the-minute, and carefully safeguarded records.

We shall now consider the details of record keeping for deposits so as to insure such records.

As in the case of meter records we find many different methods of keeping track of deposits, some of them cumbersome and unwieldy, some of them compact and efficient. Some companies keep a ledger record of deposits in a bound volume, but for any except the very small company this method is obviously unsatisfactory.

New names must constantly be added to the deposit record. Names must constantly be withdrawn. Therefore a card record which is capable of easy expansion is best.

Three Types of Card Records

There are three types of card records in use. The first is the vertical or blind card record, and is best suited for small companies. The second is the tabulating card record, which can be totaled and audited by running the deposit cards through a tabulating machine. This method is accurate, and it does care for a large number of cards in a relatively short time.

The principal objection to the tabulating card is that it must be removed from the file for auditing purposes, and no matter how carefully this is done, we object to removing a deposit card from the file at any time. The deposit card represents actual money deposited with the company. If it is misfiled or lost, the money is as good as gone, because we may at any time be called on to refund the money which it represents.

No deposit card should ever be destroyed. No deposit card should ever be removed from the file except in actual necessary reference right at the file, and it should be returned immediately after the reference has been made.

Deposit Cards Filed Alphabetically

Deposit cards should of course be filed alphabetically. Alphabetical filing requires training, if it is to be done accurately. And once a deposit card is placed in its proper alphabetic position we should take care that it stays there, or if it is removed for any reason, we should take care that it goes back to its proper place promptly.

The best way to insure this is by the use of the visible file. In previous articles in this series we have advocated the use of visible equipment for certain records and have explained the reasons for our preference. These same reasons hold true in the case of deposit records, namely—ease of reference, prevention of misfiling, signal control, and ease in

auditing We shall see how these ends are accomplished by a visible deposit record which has come into very wide use in the gas companies of the country.

The Visible Deposit Record

When a customer makes a deposit he should be given a receipt. Often the return of this receipt is demanded when the deposit is refunded, but this is a difficult rule to enforce. Most gas companies merely require the customer to sign the deposit record card, as an acknowledgment of the refund.

Deposit receipts are ordinarily made out on deposit receipt forms which are put up in book form such as blank checks are bound, each with a recording stub to be left in the book. This stub is used as a check on the cash received, and as a guide in making out the deposit record card.

The deposit card form shown here is designed for use in a visible pocket. Note that the back of the card is used as a receipt for a refunded deposit. We believe that this is better than having the deposit

DEPOSIT RECORD

NAME

ADDRESS

	NO.	STREET	APT.	FL.	CITY	DATE
1						
2						
3						
4						
5						

SERVICE	Y	AMOUNT OF DEPOSIT	DATE OF DEPOSIT	DEPOSIT RECEIPT NO.	DATE OF REFUND
ST. GAS					
P. P. GAS					
ELEC. LT.					
ELEC. PR.					
STEAM					

NAME

Face of Deposit Record Card

record and the receipt for refund in two separate places.

As a new deposit card is filed or a refund is made, a colored signal is placed on the visible portion of the card. This signal remains only until the end of the month when it becomes a guide to the auditor in checking deposit receipts and disbursements. It is, therefore, necessary for the auditor to examine only those deposit cards which have been affected by the work of the month.

The "refunded" cards should be removed from the active file at the close of each month, and placed in a vertical transfer file. But under no circumstances should a deposit card ever be destroyed. Years later it may protect us from having to refund a deposit for the second time.

Refunds Should Be Made Promptly

We desire particularly to emphasize the importance of prompt refunds. Nothing impresses a customer more favorably than the prompt receipt of his money when it is due him, and if the original requiring of the deposit annoyed the customer, it is all the more necessary that the refund be made promptly.

Deposits are refunded of course when a customer discontinues the use of service; or when he has established a satisfactory credit rating, as we have noted above.

In the first case it is especially important to check with the Bookkeeping Department to see that all bills, including the final bill, have been paid. Consequently there must be a close connection between the deposit records and the Bookkeeping Department. We must keep in mind at all times the value of prompt refunds of deposits, but in every case before refunding a deposit, we should be sure that the customer does not owe the company money.

Many gas companies have recognized the need for prompt communication between departments, and use the telautograph, the pneumatic carrier, or the direct telephone wire to facilitate such communication.

Deposit cards represent money. Before any deposit is refunded the employee making the refund should actually see the deposit card. If he finds that the customer has moved recently, within a period of possibly sixty days, and that a change of address is noted on the deposit card, he should see that all bills are paid at both addresses, or else he should make sure that any unpaid balance at the former address is included on the bill for the new address.

Address Changes

It is important that changes in address be promptly noted on the deposit card. One copy of every service application which involves a move from one address to another should go to the deposit record. The name should always be closely checked, because a customer may give his name in different ways at different times. If, for example, the name was

DATE_____ 19____

RECEIVED FROM_____ $_____

REFUND OF DEPOSIT WITH INTEREST, FOR SERVICE AS SHOWN ON FACE OF THIS CARD

DEPOSIT $_____

INTEREST $_____ SIGNED_____

TOTAL $_____

REASON FOR REFUND OF DEPOSIT

REFUNDED BY_____

Back of Deposit Record Card

originally given as James D. Brown, it may be written later as J. D. Brown. The original name should be retained and the later application made to agree with it.

Any company which has had the experience of refunding a deposit to the wrong person, or of having an incorrect address in the deposit record, will

recognize how easy it is to lose the customer's respect by such an apparently minor flaw as an incorrect initial in the deposit record.

Conclusion

The deposit record is referred to constantly. Reference must be immediate and accurate. Cards must never be misfiled. And the record must be located where it is accessible to the clerk who waits on the customer. Therefore, we suggest that deposit records be kept by the Application Department, and wherever possible, in a visible file.

The ultimate authority as to the proper care of the record is of course the Auditing Department. But with the visible signal control the monthly audit, or any check of the deposit record, can be made in a minimum of time.

Of course record keeping details must vary in different companies. But every gas company needs to remember these fundamental points about the deposit record, because they are universally applicable: (1) Never lose a deposit card; (2) Never destroy a deposit card; (3) Have the entire deposit record instantly available to the man behind the counter; and (4) Keep the deposit record absolutely up-to-the-minute at all times.

The Missing Link in Low Temperature Carbonization*

A new two-stage carbonizing process

Clarence B. Wisner

THE development of a process is a reaction between an idea, dynamic energy, time and lots of money moving against strong resistance. Frictionless bearings are not, gnerally speaking, conducive to creative thinking. If things do not go right this mixture is liable to stir up considerable exothermic heat. Patience is of the utmost importance to guard against bringing out an underdone product, or an overtuned mechanism.

Mr. Edison is reported to have answered a call for help on an electric problem with "No, I am too near to the subject; you need the help of a rank outsider." Paradoxical at first glance, it may turn out logical in an occasional instance, as in coal carbonization, where positive conclusions have been drawn from seeming facts, which have bent enough under practice to admit a new principle into the art.

An English technical writer about to release a new book on Low Temperature Carbonization says that he has already listed details of 200 processes with a few more yet to come. ("Low Temperature Carbonization," David Brownlie, in "Combustion," New York, April-October, 1926.)

If the success of a process is measured by its ability to command capital for continued plant duplication, then at the moment none has qualified.

Difficulties in producing coke at low temperatures have been so baffling, and the money spent on some processes so great without convincing issue that the public is now skeptical as to whether there is any such thing as low temperature carbonization.

The Commercial Process

But what is a commercial process? Our definition is:

1. Take high ash slack and clean it with air, reducing the ash to that of the coal in place.
2. Solid fuel must not carry more than 13 per cent ash, or 12 per cent volatile.
3. Tar recovered must pay processing cost and cover loss of heat units in solid fuel, by reason of edusted hydrocarbons.
4. Solid fuel revenue must pay for the raw coal and leave sufficient surplus to attract capital. It must be of suitable form, strength and density to command popular domestic trade, and finally it must be produced at a price to compete with domestic sized bituminous coal after market saturation in competition with anthracite and high priced smokeless fuels.

Capacity, because of the low thermal conductivity of coal, must be developed by rapid heating in a constant flowing stream at the highest possible velocity between the heating medium and the coal. Given these conditions, the time cycle from critical vapor eduction point to tar end point may be 40 minutes. This rapid pyrolysis may only be accomplished in the rotary retort, if full values of products are to be conserved.

A Dual Process

As a result of our six years of intensive work, we are now able to offer with confidence a new, if radical, principle to the art of low temperature carbonization, of technical and practical interest to the coal world. It is a dual or two-step process, in which an oxidizal thermal pre-treatment known as thermodizing brings new conditions under which the solid fuel made in the retort is of a great weight and

* Delivered at the Pittsburgh Conference, Carnegie Institute of Technology.

density as by-product coke made from the same coal. This, of course, is directly opposed to present theory and practice, and at the same moment this view is seemingly sustained by the fact that rotary processes are generally looking to briquetting their residual char for domestic fuel.

The difficulties encountered by the various processes in reaching quantity production bring us to the subject of this paper: The Missing Link in Low Temperature Carbonization.

It is realized that we are now moving on to dangerous theoretical ground and that we may be, figuratively, burned at the stake by the orthodox school.

Nevertheless, thermodizing means all that the title conveys to low temperature carbonization, and is the logical catalytic agent between practice and process. It is not based upon an unbaked theory, for every condition set forth in this paper has been convincingly proven in practice, and thermodizing is about to be put into commercial use. Well, of course, if it sustains our large scale experimental operations a revolution must take place in orthodox ideas of carbonization practice.

Its Inception

Dual or two-stage processes had their inception in two original sources, each, however, from an entirely different angle:

Parr & Layng, at the University of Illinois, working on the theory that if coal be pre-heated near to the critical vapor eduction point away from air, and then charged into a vertical retort with wall temperature held at 750° C., wherein the charge remains quiescent, carbonization may be completed autogeneously assisted by the exothermic heat generated within the coal during pyrolysis. ("Coal Carbonization," Porter, p. 380.)

The Carbocite Company's plant at Canton, Ohio, operates a continuous process. (For more complete description, see "Combustion," for June.) In a continuous process one may discharge and examine both gaseous and solid products at any stage and temperature, and while we were able to co-ordinate practice and different types of coal, in many instances it was done at the sacrifice of text books and theory, and we expect the practice developed to have a strong influence on theories of the future. The process comprises two steps:

1. Thermodizing—Heating the raw coal up near to the vapor eduction point in an oxidizing atmosphere, until its swelling and agglutinizing quality is tempered to the extent desired, and then,
2. Carbonizing—Confining the pre-treated coal in a closed container and flooding it with extraneous heat, to maintain the charge at a hydro-carbon vaporizing temperature.

Rotary Retort Used

We accepted the rotary type retort as our process medium after due cnsideration of the difficulties experienced by others, and formed the opinion that they were not unsurmountable. One only will be referred to here, the sticking of the coal to the walls of the retort, which is not inherent in the coal itself but in the manner in which it is treated.

The maximum operating temperature in the steel walls of the retort must not exceed 500° C.; if you drop tar on the walls at a higher heat the light oils boil off, leaving behind a coke residue securely glued to the steel, and this applies to the educted vapors, cracking takes place and amorphous carbon is left behind to carbonize the walls. The trick is so to manipulate the mechanism operating at this low temperature as to get a high transfer through the steel.

This is accomplished by direct regeneration; that is, for each pound of charge we circulate 2 to 2½ pounds of heating gas around the retort at high velocity, drawing back the spent gas at some 500° F. to the combustion furnace, where 25 per cent of new gas at combustion temperature is introduced and a like amount discarded to the stack. The fresh high temperature gas maintains the desired constant heat with a minimum quantity of fuel.

The maximum load in either retort is 12 pounds per square foot of peripheral surface and fills one-sixth of the cubic space. This light load makes very rapid heating practical, and as we may not go to high temperatures we must move against the steel a large volume of hot gas at high velocity. It is purely mechanical so long as time, temperature, and air constants are recognized and respected. It is operated with unskilled labor in a foolproof manner.

Formation of Coal Balls

I will mention one more difficulty in the use of the rotary retort in which coal blending is not a satisfactory answer, viz.: the rolling up of the softened coal into balls too big to get out of a gas-tight discharger. The larger the ball the higher the heat required to reduce the volatile; in fact, we found it impossible at our maximum temperature to reduce volatile in balls of 6 inches and larger below 16 per cent to 20 per cent.

Coal balls are, we believe, an appropriate name for our solid fuel. It is a product with an exclusive individuality, smooth, irregularly round, of varied shapes and sizes, distinctly differentiated from one-sized artificial briquettes, and is the exclusive product of thermodizing. To make coal balls, we first thermodize the raw coal; that is ,we heat and hold it in an oxidizing atmosphere the necessary time to produce the sized balls desired, at a temperature of 250° to 275° C. In this step two-thirds of the entire processing heat is driven into the coal, and the hot dry coal is in ideal condition for completion into coal balls as it flows into the carbonizer. The size is restricted to pass a 3-inch ring and the fines are screened out on a quarter-inch screen; 10 per cent to 15 per cent of fine dust is eroded from the fuel in tumbling through the retort, which may be burned as powdered fuel or fed back into the raw coal.

Coke Breeze Bought With Coke

It is becoming popular with domestic coke users to buy with each ton of coke 500 pounds of breeze, using it to fill the voids and bank the fire at night, giving more uniform combustion. Coal balls, when

they break from dropping, do not crumble, but break into a few pieces. This breakage will never make as much breeze as will be found desirable in burning.

Coal balls are made after a carefully worked out method: At the close of the intumescent period, when all of the tar vapors have been driven off and expansion has stopped, we stop and discharge our product, because at this point coal balls are of maximum weight and density. If carried to a higher temperature, counter-action and cracking begin. This critical temperature varies with the type of coal from 400° C to 480° C.

Domestic fuel stands first in the demands on low temperature carbonization, and that is why we stop at total tar eduction. By stopping here without waiting to get all the gas that would be driven off at our maximum temperature, we save about one-half of our time cycle and increase our output accordingly, which compensate for the gas left in coal balls. Because of the perishable nature of the gas, it must be disposed of every hour in the year, offering a very serious difficulty, but in suitably located plants it will be a real relief.

Tar Recovered Has Value

Just a word as to the 28 to 32 gallons per ton of tar oils which the coals hereafter mentioned produce per ton of raw coal. It has been stated that its value is problematical. To this we cannot agree. Our tar cracked in an ordinary petroleum refining process at 100 pounds pressure gave:

1. Twenty-two per cent water white motor fuel, 50 per cent aromatic, appraised by competent authority as having a value half-way between straight gasoline and pure benzol; it is a no-knock fuel of the highest order, miscible with lower grade fuels increasing power and decreasing carbon deposits.
2. Thirteen per cent clean tar acids.
3. Thirty-five per cent no-ash coke.

The cracking process may be profitably installed at any plant with a tar output of 1,000 barrels or over per day.

Tar refiners see value in it above its fuel value and offer long-time contracts for production.

Tar should follow petroleum prices, with every evidence looking to increased demand and decreased supply. At present the value of the tar fully meets our specification.

Having in our practice cut out salable gas, we answer the question, "What about it?" with the statement that a constant hourly supply does not fit a 12 hour or a 6 months' peak demand, and that blue water gas regulated to the demand, made at the point of consumption, is the most economical and cheapest supply for both industrial and domestic fuel purposes, and that coal balls are the ideal source from which to make the gas.

Tests on Various Coals

Having told you briefly of our practice, I want to tell you of demonstrations made with the types of coal that provide the bulk of the country's domestic fuel. When we first undertook to thermodize Pittsburgh No. 8 coal, which you will recognize as our greatest coking coal, it looked as though we had reached our Waterloo. The effect of air was negligible when we crushed all through a three-fourths inch screen. Reducing the size to pass all through a three-eighths inch screen partially restricted agglutinizing, but we were not able to completely kill it on this size. This is where we made our first balls so large that tumbling in the retort sounded like a foundry rattler. Practice brought sizes to a predetermined specification.

Moving over the Ohio state line, the No. 6 vein predominates, a highly volatile, high oxygen, and violently swelling coal. Carbonized direct, the solid fuel was of the consistency of pop corn and weighed 17 to 19 pounds per cubic foot; adding coking coal as high as 30 per cent gave about 50 per cent of weak, unmarketable balls. A little air in thermodizing killed any coking tendency, and we finally found the solution in a blend of 85 per cent of No. 6 with 15 per cent of No. 8, but not without the air pre-treatment. We then produced 85 per cent balls weighing 27 pounds to the cubic foot, meeting our specification in every particular.

We have processed three types of Indiana coals without blending, and a fourth requiring slight blending. In each instance the coal balls weighed 27 pounds, which is the same weight as by-product coke of equal size made from the same coal in the ovens at Terre Haute.

Value of Coal Balls

Having processed these various coals, we believed that domestic coal balls may be commercially made in practically all of the mining districts throughout the country. You will appreciate the superiority of these natural coal balls containing a uniform gas content which burns with a pleasing flame until entirely consumed—without smoke or odor, and clean. Briquettes have a prohibitive cost in competition with the cost of free coal balls. These features have caused coal operators to offer raw coal for a plant now building in exchange for coal balls at a satisfactory spread in price to meet the financial side of our specification.

We see Parr & Layng calling for the total exclusion of air in their pre-heating, positive that any oxidizing influence would be fatal to their process and depending alone on blending to overcome swelling and get proper weight and density in their solid fuel.

Now we come before you just as positive that present theory and practice inherited from by-product practice are wrong and not applicable to low temperature carbonization. Twenty-five years of research and experimental practice have not advanced the art into commercial low cost production. We believe that the solution of the problem is at hand, and offer thermodizing as the liaison between process and practice. Paradoxical as it may seem, high oxygen coals require an oxygen bath to increase weight and density, in which oxygen may be extracted and not absorbed, evidenced by weight of coal balls. Until

we know the reason why, it certainly looks as if some legerdemain takes place when we see fine coal tumbled loosely through a rotary retort and discharged in coal balls of the same weight as by-product coke made from the same coal.

But these seemingly radical statements are based on convincing demonstrations, which indicate that low temperature practice must be entirely divorced from high temperature theories. We do not deny that we are earnest students of theory and practice of the world's greatest fuel problem; but indifferent as long as we can save 90 per cent or better of the heat units contained in the raw coal and produce the highest quality products.

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STUDY OF PUBLIC UTILITIES THROUGH COLLEGE COURSES SHOWS BIG INCREASE IN U. S.

Teaching of public utility management and economics is spreading throughout the United States, according to reports received by the Pennsylvania Public Service Information Committee.

Special courses on public service are being conducted by leading institutions of learning all over the country, while the extension departments of others are actively preparing additional courses to be commenced next year.

Stimulation of interest in utilities, the committee believes, has come in several ways. Wide diffusion of public utility securities through sales to customers and employees has focussed popular attention on the industry. The educational institutions, more than ever before, are being besieged by the utility companies for trained men. Public service information committees in thirty-seven states are co-operating with the universities and colleges in formulating curricula.

The University of Pennsylvania, Harvard University, the University of Illinois, University of Iowa, Northwestern University, Indiana University, and the University of Pittsburgh are among those who have listed courses in public utility management.

Others, including the University of Illinois, Ohio State University, University of Michigan, University of Tennessee, University of Wisconsin, Johns Hopkins University and the Massachusetts Institute of Technology are offering special courses in gas engineering. The William Penn Evening High School, Philadelphia, has announced two special utility courses.

Columbia University this summer gave a course on gas production, distribution and utilization and the same institution, with the co-operation of the American Gas Association, is planning a two-year correspondence course on manufactured gas.

Pennsylvania State College has announced a correspondence course on public utility economics and Rutgers University is preparing a comprehensive course.

Several are giving short courses on gas meters for company employees. Among those institutions are Purdue University, University of Illinois, Iowa State College and the University of Oklahoma.

The Educational Bus

A new aid in popularizing home service through a community

Edith Yeager

THE Home Service Division of the Westchester Lighting Company has something new and vastly original to offer the women and housewives of Westchester in its new "Educational Bus." This is especially attractive for the outlying districts. In these sections it is not always expedient for the housewife to attend many, if any, of the Home Service demonstrations, which are given daily in the main floor kitchens of the company's offices in the different district offices. These demonstrations hold much of vital interest and value for the housewife which she should not miss. This very ingenious device was thought of to permit the busy housewife in the suburban districts to share in the splendid educational advantages Home Service has to offer.

The "Educational Bus" is to tour the county. Its field of operation covers more than four hundred square miles, within which are four cities, twenty-three villages and sixteen townships. Lecture demonstrations will be given in the "bus" on the modern ways of preparing food which will shorten the working hours of the housewife. Mothers and housewives will have an opportunity to see the latest gas appliances in actual operation. Simple cooking lessons will be given the children as well as talks on health. Miss Margaret Hutton, B. S. is the domestic science teacher. The women of the county may call upon her expert services for advice on cooking, menus, baby feeding, food for the invalid. Miss Hutton has twelve assistants who go into the homes when called on and give practical demonstrations of cooking.

New Appliances Followed Up

These twelve directors also follow up new appliances. If the housewife experiences any difficulty with her new appliance these women straighten it out. They show her how she can obtain the best results from the appliance by making the housewife familiar with its operation. They help the salesman because they go further than the actual sale. They do all in their power to make the customer completely satisfied. They stimulate sales by recommending the use of appliances that are time and labor saving. They create a desire in the mind of the housewife for a certain appliance by showing her how she can cook her meals and keep her house systematically through its use. Through demonstration and close personal contact of the Home Service directors in the different district offices, satisfaction in the use of these different appliances is assured.

The Exterior of the "Bus"

Details on the Bus

The bus has a seating capacity of 37 persons. The seats are arranged at the sides and the middle with a center aisle. At the front end of the bus is a sink with running water, a unique and complete plumbing arrangement. There is a stove for demonstrations with oven heat regulator. There is a table and cupboards. There is space for the newest gas and electrical appliances; those that are too large to keep in the bus regularly will be carted, when needed, from the nearest district office.

The regular entrance to the bus is near the front at the side. There is an additional door, an emergecy safety feature, at the rear of the bus. This door is used for exits as well as for taking appliances in and out. There are windows the entire length and width of the bus, which may be opened on warm days. A ventilator with an exhaust fan, is installed at the front of the bus where the demonstrations take place. It will not only serve to keep the air in the bus fresh when the weather is too cold to have the windows open, but will efficiently carry off the odors of cooking. Visitors at all times may be assured of a comfortable, restful, instructive visit.

The Interior of the "Bus" Showing Gas Range and Seats for Visitors

No effort, time or research has been spared by the company to make this added service a worthwhile help to the women in the home. A visit to the "Educational Bus" will cost the housewife nothing. There she will find a welcome as hearty and sincere as in the home of a friend!

GAS USED IN N. Y. STATE SAVES SIX MILLION TONS OF COAL A YEAR

The ten million people in New York State who use manufactured gas in their homes, and the factories which use this fuel for industrial heating, are this year driving the gas companies of the state to new high marks. Estimates based upon the production of gas for the first nine months of 1926 indicate a total for the year of approximately 110 billion cubic feet, says the New York State Committee on Public Utility Information.

This is an increase of ten per cent over the total for 1925, itself a record year, and is more gas than was consumed in the entire country in 1900.

New York State, with 2,725,000 gas customers, uses about one-fourth of the country's production of gas, and new customers are being added to the supply systems at the rate of ten thousand a month. Of the total number of customers about eighty per cent are domestic, and it is estimated that more than 90 per cent of all homes in towns of 10,000 or more now use gas for cooking and other purposes.

The 545,000 industrial users of gas fuel consume approximately one-fourth of the total production in heating operations as widely divergent as sponge-drying and cake baking. This industrial use began about 1900, and in the last ten years has increased 2,000 per cent.

Of the total consumption of gas in the state, New York City uses about 78 billion cubic feet, or one and a half billion cubic feet a week, chiefly supplied by the largest interconnected gas system in the world

The Dehydration of Gas*

III. Details on use of refrigeration method

F. W. Sperr, Jr

THE Carrier Engineering Corporation has lately developed a new type of refrigerating plant, one installation of which is illustrated in Figures 7 and 8. This particular installation has capacity equivalent to a 100-ton ice machine. It is designed for dehydrating 7,000 cubic feet of air per minute when measured at atmospheric pressure. The air is compressed to about 25 pounds per square inch and cooled to a temperature of 43 degrees F. so that the dew point of the dehydrated air at atmospheric pressure would be about 19 degrees F.

Fig. 7

The outstanding features of the new refrigerating machine are:

1. The employment of a multi-stage centrifugal compressor operating at approximately 3600 r.p.m.[16]
2. The use of dichloroethylene, commercially known as dielene, as the refrigerant.
3. Automatic temperature control.

This centrifugal refrigeration system is remarkably compact, occupying less than 25 per cent of the space required for the usual refrigeration systems of the same capacity. For example, a 160-ton unit now in operation occupies with all its auxiliary parts a room approximately 12 feet square. The refrigerant, dielene, is slightly modified so as to be non-combustible. It is a completely stable liquid at ordinary atmospheric pressures and temperatures and is said to be entirely safe to be conveyed in open containers. The specific gravity is higher than that of water and the vapor is 3½ times as heavy as air. The characteristics of the refrigerant are such that the system is operated under vacuum instead of under the high pressure characteristic of the ammonia, carbon dioxide, and other common systems.

The brine or water to be cooled is circulated through brass tubes enclosed in a steel shell and the liquid refrigerant is sprayed over the tubes and caused to evaporate under 25 inches to 28 inches of vacuum created on the intake side of the compressor. The refrigerant vapor then goes to the compressor and after compression, goes to the condensor where it is again liquified, after which the liquid returns to the cooling unit, completing the cycle. In most air conditioning systems no brine is used, the cooling water being circulated through the tubes in the cooling unit. It is claimed that by virtue of the automatic control, such water may be cooled to 35 degrees F. without danger of freezing.

Special Considerations Affecting the Employment of Refrigeration for Dehydrating Manufactured Gas

The foregoing discussion of refrigeration as applied to the drying of air has been given at some length because of the close analogy to the problem of dehydrating manufactured gas. The following deductions are believed applicable:

1. The simple single stage system strongly advocated by Johnson wherein the air is passed over cooling coils in which the refrigerant—i.e., ammonia—is caused to expand, does not appear to have found favor in the drying of air, but is worthy of investigation particularly in connection with small gas works. Such a system is illustrated in Figure 9. At least two cooling chambers must be provided and the arrangement should be such that the incoming gas may be used to thaw the ice from the cooling coils of one chamber before passing into the next, the chambers being reversed as often as necessary. In this way considerable refrigerating economy is possible.
2. The most efficient means developed in air conditioning consists in using water or brine as the

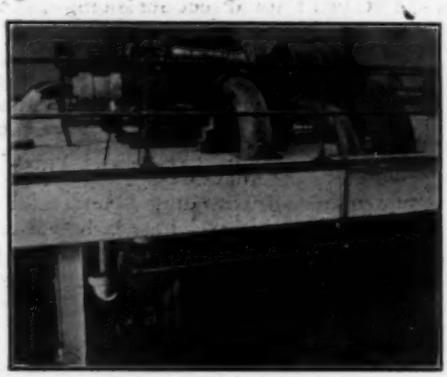

Fig. 8

cooling medium. In the dehydration of gas, the water or brine would be cooled in the refrigerating machine and then brought directly into contact with the gas in an efficient type of scrubber. It is naturally assumed that the gas would first be cooled as much as possible by standard methods. The brine or water leaving the gas scrubber would then flow back to the refrigerating plant.

3. There are several objections to the use of brine in such a system. Means would have to be provided for evaporating the condensed moisture and re-cooling the evaporated brine. It is said to be more difficult to avoid the entertainment of minute droplets of brine in outgoing air from such a system and

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* Third installment of Mr. Sperr's article.

such entrainment would be a serious matter in an artificial gas system.

4. Using water as a cooling medium, single stage cooling to a dew point of 38 degrees to 40 degrees F. can probably be satisfactorily accomplished. This might be sufficient for systems in warmer climates.

Three Alternatives Offered

5. For reduction to a dew point of 30 degrees F., the present state of the art would appear to offer three alternatives:

(a) A two-stage system in which the gas would first be cooled to 38 degrees to 40 degrees F. by direct

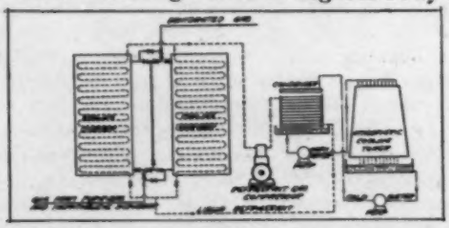

Fig. 9

contact with water from the refrigerating plant and then would pass through a chamber filled with coils in which it would be finally cooled to 30 degrees F. The coils might be cooled by means of brine from the refrigerating plant or else arrangements might be made to evaporate the refrigerant directly in the coil chamber as in Figure 9.

(b) A two-stage system similar to (2), but using refrigerated brine for direct scrubbing of the gas in the second stage. Special precautions would have to be taken to prevent entrainment of brine.

(c) A combination system in which the gas would be compressed as much as necessary and then cooled to 38 degrees to 40 degrees F. by direct contact with refrigerated water so that the cooled compressed gas when released to the final distribution pressure would have a dew point not exceeding 30 degrees F.

6. A system of heat exchange in which the cooled gas would be used to pre-cool the warm gas entering the system is believed to offer no advantages because of the small temperature differences available.

Power Principal Expense

The principal item of expense of cooling by refrigeration is the power requirement. The method of calculating this may be exemplified as follows:

Let T_1 = The low temperature of the refrigerant gas (absolute).

T_2 = The high temperature of the refrigerant gas (absolute).

Q = Total heat removed in B.t.u. per minute.

T_2 depends upon the temperature of the cooling water available and this also determines the temperature of the gas to be dehydrated. Under average conditions there is a difference of 10 degrees F. between the temperature of the gas to be cooled and the temperature of the water which is doing the cooling. Beyond this we have a difference of about 5 degrees between the temperature of this cooling water and the high temperature of the refrigerant gas. T_2, which is the high temperature of the refrigerant gas, is therefore about 15 degrees above the temperature of the gas to be dehydrated. Similarly the low temperature of T_1 of the refrigerant gas is about 15 degrees less than the low temperature of the gas.*

Q is the sum of the sensible heat of the gas, the sensible heat of water vapor, and the latent heat of condensation of the water vapor.** The theoretical horsepower required for refrigeration is

$$hp = \frac{778}{33000} \cdot Q \cdot \frac{T_1 - T_2}{T_1}$$

The ratio of actual to theoretical horsepower depends upon the magnitude of

$$\frac{T_1 - T_2}{T_1}$$

and is shown graphically in Figure 10 which is taken from Johnson's book.

A similar curve has been plotted by J. J. Smith,‡ which indicates somewhat higher actual efficiencies, but Johnson's figures may be taken as safely conservative, and the difference for practical purposes is not very great.

Power Calculations

Following are calculations of the power required for single stage dehydration, assuming 1,000,000 cubic feet of gas per day to be cooled by refrigeration from 80 degrees F. to 30 degrees F.:

1,000,000 cu. ft. gas at 60° F. + 30" Hg. Volume of gas at 80° F. sat. = 1,000,000/0.946 = 1,058,000 cu. ft. per day.

Volume of gas per minute = 1,058,000/24 x 60 = 734 cu. ft. per min.

Water vapor in 734 cu. ft. of gas sat. at 80° F	=	1.16 lbs.
Water vapor in gas cooled to 30° F.	=	0.18 lbs.
Water removed by cooling to 30° F.	=	0.98 lbs.
Weight of dry gas in 734 cu. ft. sat. at 80° F	=	22.85 lbs.

Q =

(1) **Sensible Heat of Dry Gas**
22.85 lbs. × 0.648 × (80 — 30) = 740 B.t.u.

(2) **Sensible Heat of Water Vapor***
(a) 1.16 × 0.45 × (80 — 62) = 9.4
(b) 0.18 × 0.45 × (62 — 30) = 2.6
— 12 B.t.u.

(3) **Sensible Heat of Condensed Water**
0.98 × 0.45 × (70 — 62)** = —3.5 B.t.u.

(4) **Latent Heat of Condensation**
0.98 × 1057 (at 62° F)* = 1036 B.t.u.

Total Heat per Minute Q = 1784.5 B.t.u.

* It is easy to confuse the application of T_1 and T_2 in the frequently published formula because most writers speak of these symbols as referring to the temperature of the gas without making it clear that they mean the refrigerant gas, i.e. ammonia, etc. The writer is indebted to The Carrier Corporation for making this point clear.

** This assumes a system in which no ice is formed, otherwise the latent heat of freezing should be included.

‡ Met. and Chem. Oct., 1912, p. 657.

One (1) Ton Refrigeration per day = 200 B.t.u. per min.

Tons of Refrigeration Required

$1785/200 = 8.93$ tons per day per million cu. ft. gas

Horse Power Required: (Theoretical)

$T_1 = (30° - 15°) + 460° = 475°$

$T_2 = (80° + 15°) + 460° = 555°$

$$hp = 0.0235 \cdot Q \cdot \frac{T_1 - T_2}{T_1}$$

$$= 0.0235 \times 1785 \times \frac{475 - 555}{475} = 7.06$$

Applying Johnson's factor for actual horsepower

$7.06 \times 1.65 = 11.65$ hp.

There is a small additional power requirement on account of circulating the cooling liquid. This amounts to approximately 0.01 hp. per M. cu. ft.

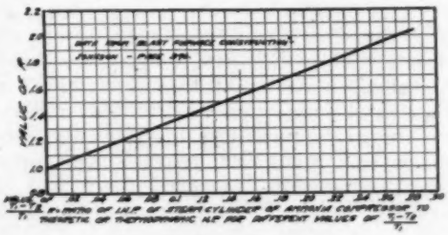

Fig. 10

Diagrammatic Representations

The power requirements for cooling gas from different initial temperatures to final temperatures of 40° F. and 30° F. respectively (not including power for circulation) are shown in Figure 11, which has been calculated by the above method. The circulation maintained in any case may be assumed to be approximately 20 to 25 gallons per thousand cubic

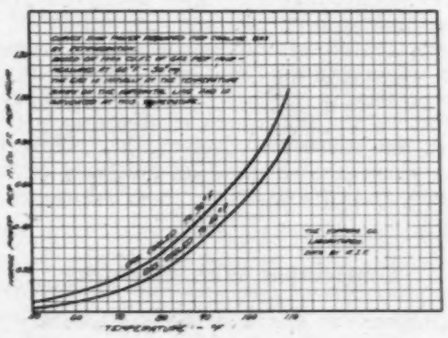

Fig. 11

feet, which would supply the necessary cooling even under the most unfavorable conditions. The power required for circulation may be taken as approximately 0.01 hp. per M. cu. ft. of gas per hour.

* 62 degrees F. = temperature at which one-half of water removed will be condensed out.

** 70 degrees F. = taken as temperature of outlet cooling brine.

The power required for dehydration in a compression system may be greatly reduced by supplemental refrigeration, using water cooled in the refrigerating apparatus to 34° F. to 35° F. With such water, the

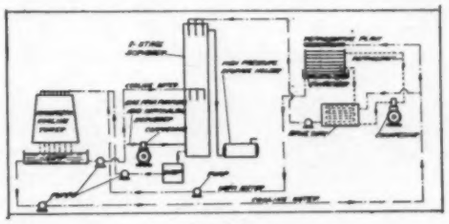

Fig. 12

compressed gas could be readily cooled to 40° F. At this temperature the pressure required to produce a dew point of 30° F. in the gas released to atmospheric pressure is only 7.7 pounds. A flow sheet for such a system is shown in Figure 12. A two-stage scrubber is used for cooling the compressed gas, ordinary cooling water being used in the first stage and refrig-

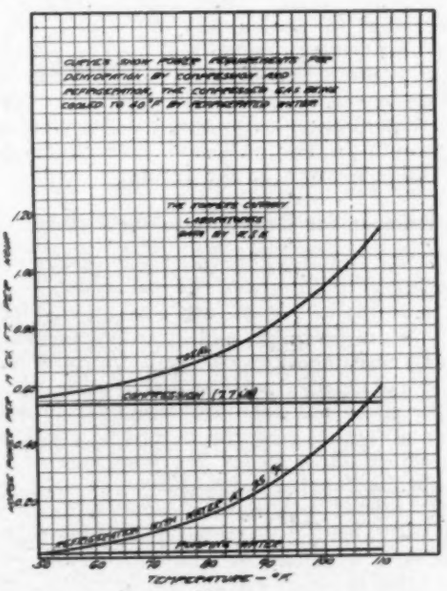

Fig. 13

erated water in the second stage. The power requirements for dehydration by this method are shown in Figure 13. In preparing this figure, the endeavor has been made to estimate the practical rather than the theoretical power. This should be borne in mind in making any comparison with Figure 6.

Loss of Heat Due to Light Oil Deposition

In the dehydration of coal gas by refrigeration, the loss of heating value due to deposition of light oil would be expected to be much less than in dehydration by compression. Experiments made by the Research Laboratories of The Koppers Company, in which coke oven gas of 535 B.t.u. per cubic foot was cooled by passing it through a coil of copper pipe

(Continued on page 638)

Why Gas Industry Has Real Future*

Domestic sales and good-will backbone of industry

William A. Hanway

Corporation Department, Harris, Forbes & Company

IT is a very embarrassing thing for a layman to have to stand up here and try to tell you experienced gas men something about your own industry, but your Governor, M. B. Webber, was very insistent that he wanted to have put before you the point of view of a bond house that sells gas companies' securities to the public. The buying department of a bond house always has to work from the point of view of what is going to happen in the future. The important bond houses of today are able to sell the enormous volume of securities that they do because they number among their customers thousands of people who are getting on the dot the interest and principal on the bonds which they bought twenty-five and thirty years ago, and if these bond houses expect to be able to continue in business twenty-five and thirty years hence, they have to make sure that the bonds they are selling today are going to be paying principal and interest on the dot in 1950 and 1960. Consequently, the buying department of a bond house looks with particular favor on the securities of an industry that has shown a steady, stable growth in the past and give promise of a steady, stable growth in the future.

Reasons for Believing in the Future

I would like to put before you some of our reasons for believing in the future of the gas industry. In the first place, we believe in its future because of its past. Gas, as you are probably told by every speaker who addresses these meetings, is, next to water supply, the oldest public utility. The distribution of gas in the bigger cities has been a commercial success for well over a century and the record of the business throughout all those years has been one of practically unbroken increase in volume of sales. This wonderful record was not achieved without much thaught and labor. Selling the gas industry to the world took a tremendous amount of energy and ability. Sales resistance is a mild word to apply to the situation that the founders of the industry had to buck up against. When Frederick A. Winsor was promoting in London the world's first gas company back in the first decade of the last century, he aroused a storm of popular protest. Newspapers were 100 per cent against him. One London newspaper characterized the scheme as "wild, absurd and extravagant in its conception and fraught with the greatest danger in its execution". In this country many cities refused for a long time to allow gas companies to start in business.

Use of Gas Fought in Past

Offers to light Philadelphia with gas were refused in 1803 and 1817 and as late as 1833 a petition signed by hundreds of citizens was addressed to the Select and Common Councils of that city protesting against the introduction of gas as a "most inexpedient, offensive and dangerous mode of lighting" and earnestly soliciting that the use of oil might be continued. Even after the industry was well on its feet there were always prophets foretelling its immediate downfall. The introduction of kerosene oil lamps was heralded as the end, and when the incandescent electric light which Edison had brought out in 1882 proved successful, people of the more pessimistic turn of minds felt that the end of the gas companies was merely a matter of a few years. And yet in 1882 the gas companies were only entering upon the period of their real growth. In 1926, four and one-half decades after the first electric central station was installed, it looks as though sales of gas are going to total four hundred and fifty million cubic feet, as compared with less than twenty-five billion in 1881. The forty-five years since competition from electricity first appeared have had the net effect of increasing the consumption of gas over 18 fold.

A Tribute to the Gas Industry

No company is, however, going to be able to continue very long paying its interest in the 1930s out of the earnings of the 1910s. An industry's past record is very useful in forecasting its future, but the record must be considered in the light of present day conditions and this is where I want to pay a tribute to the whole present management of the gas industry. In the past many gas companies, yes most gas companies, have had the reputation of being ultra-conservative and non-progressive, looking with distrust at innovations and changes. But if this were ever true, it certainly is a thing of the past. Conservative, the management of the industry certainly is, but conservative in the best sense of the word; conservative in that its policy is to test all things new and to hold fast to those which are found good.

Competition With Electricity

The progressive spirit of the gas industry definitely awakened back in 1882, when competition with electricity became a reality. Up until that time gas had had it own way in the lighting field. You gentlemen can probably tell me certain applications in which gas light still has advantages over electric light, but speaking from the layman's point of view, electric light certainly seems to have supplanted gas as the most effective and convenient illuminant available. When competition with this new illuminant came in, the gas companies had to get out

(Continued on page 638)

* Delivered at the November meeting, Gas Sales Division of N. E. Gas Association.

As The Journal Views It

MERCHANDISE SALES AND THE DOMESTIC LOAD

The gas company is and should be vitally interested not only in maintaining its domestic load but in increasing it in every possible way. For after all the domestic load is the back-bone of the gas business, and although it may appear to some that it is a load that cannot be lost, nevertheless, it is true that there are influnces at work at present tending to reduce the consumption of gas in the home. It is almost an axiom that when a condition of this sort is not actively fought in a business, and that when the directors of a business are lulled into a false feeling of security by the fact that it is being kept on the same level from year to year, disaster eventually ensues.

In other words, what we wish to bring out here is that the gas industry should not be satisfied with merely keeping its domestic load at a certain fixed level. This is no indication of progress; on the contrary it shows that active effort is not being made to increase that load and to encourage increased use of gas in the home. It is accordingly incumbent upon the gas company to adopt every means possible to increase its domestic business. It must be said that good progress is now being made in this direction.

One method which appears to have given very good results in Chicago and elsewhere where it has been tried and which pertains particularly to the use of gas in the kitchen, is the sale of kitchen utensils and merchandise on the premises of the gas company. At first glance, this might appear like mixing oil with water and that the gas company is adopting a plan of doubtful value to compete with the department and hardware stores. But, on more careful investigation it will be found that there is perhaps no better place in which to sell labor-saving, kitchen devices, than in the gas store, where that principal kitchen appliance, the gas range is likewise being sold.

It is all a question of popularizing cooking and making it convenient instead of a bothersome task. The delicatessen store and the restaurant are active opponents of the home-cooked meal. They must be counteracted, and what better way is there of doing so than in teaching the home manager how more conveniently and more effectively to cook the home meal. The display and sale of labor-saving, ingenious, kitchen utensils, along with the gas range, cannot fail but help to convince the home manager that under the proper conditions it is perhaps just as easy for her to cook a meal at home as it is to go out and eat it at a restaurant or buy prepared foods in canned form. And in addition thereto she can be sure that her family is being fed with wholesome food.

Finally there is no question but that the use of these appliances in the kitchen not only makes cooking easier but it makes it also more interesting, and in encouraging the use of these utensils by displaying and selling them in the gas office, the gas company is performing an important task, not only of distinct advantage to itself but also of real importance to the community as a whole.

REACHING THE ARCHITECT

When the commercial department of a gas company is confronted with a situation wherein the owner of a house is desirous of supplementing the uses to which the gas service is now being put but is prevented from so doing by inadequate pipe sizes and the like, then, it has brought home to it in a very decisive manner the fact that the gas industry in the past had not sold the architect and the builder on its service. Such an experience teaches better than many verbal admonitions the necessity for the gas industry to reach the architect and to sell him on gas.

In an article published in the November 13th issue of this Journal, this subject was very thoroughly and capably discussed by a prominent architect. It is not necessary to call the attention of the gas men to the activity that has been prominent for the past few years in the building industry, and great increase

in the number of structures erected. Each home has represented a potential gas customer, and this is also true of other structures such as halls, theaters, office buildings and the like.

While it may be true that the average architect and builder are always ready to provide for gas outlets in the kitchen to accommodate a range, and in the cellar for a water heater, nevertheless, they do not as a general rule go much further than this. But, in the past few years, the domestic field has been broadened and now gas is being widely sold for house heating, for various uses in the laundry, for incineration and will shortly be sold as well for refrigeration. If the gas industry is really anxious to put its service across and to increase its domestic business to a considerable degree, it must first convince the architect and builder that there are other uses for gas, such as has been mentioned above, with which he may not be familiar, but which are in every way just as important as the common ones which he may perhaps know.

This means that the gas industry and the gas company must maintain a bureau for serving the architect and the builder. They must send to him all sorts of information on gas appliances and on the uses of gas and keep him advised of all new developments. This work must be regular and systematic and the information must be put out in such form as to be attractive.

There can be no question at all but that if the gas company sells itself to the architect, it would also sell itself to the builder and through them to the ultimate consumer. It will in this way acquire customers, not perhaps so much in the fields of cooking and water heating, which are rather well covered, but in the other newly developed fields such as house heating, incineration and refrigeration. It will help itself to build up every phase of the domestic business and will thereby gain real friends—and of this there surely can be no question—that are in the position to aid it materially.

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THE DEHYDRATION OF GAS

(Continued from page 635)

placed in a freezing mixture showed no appreciable reduction of heating value at temperatures over 5° F. Below this temperature, the heating value diminishes quite rapidly. These tests were made on gas which had been treated in the new naphthalene scrubber of the Seaboard By-Product Coke Company, the amount of oil used in this scrubber being about 20 gallons per million cubic feet. Earlier tests made on coke oven gas with a heating value of 585 B.t.u. per cubic foot cooled by direct contact with the sodium carbonate solution used in the Seaboard Liquid Purification Process showed an average loss of 5 B.t.u. per cubic foot at 38° F. There was no loss at 45° F. The tests reported by B. C. Aschof[18] on coal gas at 512 B.t.u. per cubic foot showed no appreciable reduction of heating value at 7° F. At 3.6° F. there was a loss of about 10 B.t.u. These tests were made by indirect cooling. Not much information is available on the effect of cooling of carburetted water gas of the lower heating value used in present-day practice, but the loss for a given amount of cooling might be expected to be somewhat higher than for coal gas of the same heating value.

Cooling by direct scrubbing with water or brine would probably be very effective in removing naphthalene, but its effect on gum-forming constituents of gas is unknown and would have to be determined experimentally.

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WHY THE GAS INDUSTRY HAS A REAL FUTURE

(Continued from page 636)

and scratch. This was probably the best thing that ever happened in the gas industry, for the growing success of electricity as a lighting medium stimulated the development of the other and far greater field for the use of gas as a fuel, a heating medium. The kitchen stove saved the day, and after the kitchen stove came the thousand and one other appliances for using gas which have made the homes of this country more attractive and have lightened the labors of men and women in kitchens, laundries, shops and factories in every state.

Developments in the Gas Industry

Again speaking as a layman, the past ten or fifteen years seem to have been full of significant developments for the gas industry. This has, for instance, been the period of great development in the industrial field. More and more industries have come to realize the vital importance of precision in all heating operations and, therefore, the basic economies of using a fuel which will permit an exact control of temperatures. You gentlemen are, of course, primarily interested in the domestic field and here, too, looking at the thing as an outsider, there seem to have been great developments. Much has been done in the way of developing new appliances. The radiant heater of today shows wonderful improvement in efficiency over the old gas log. The developments that are making possible gas fired furnaces for central house-heating plants are particularly significant. I understand that at the recent convention at Atlantic City, there were several styles of ranges shown with kitchen heating appliances attached which certainly seem to dispose of the one good argument left for the use of the coal range. Now we are promised that a gas refrigerator will

(Continued on page 640)

INDUSTRIAL GAS LESSONS

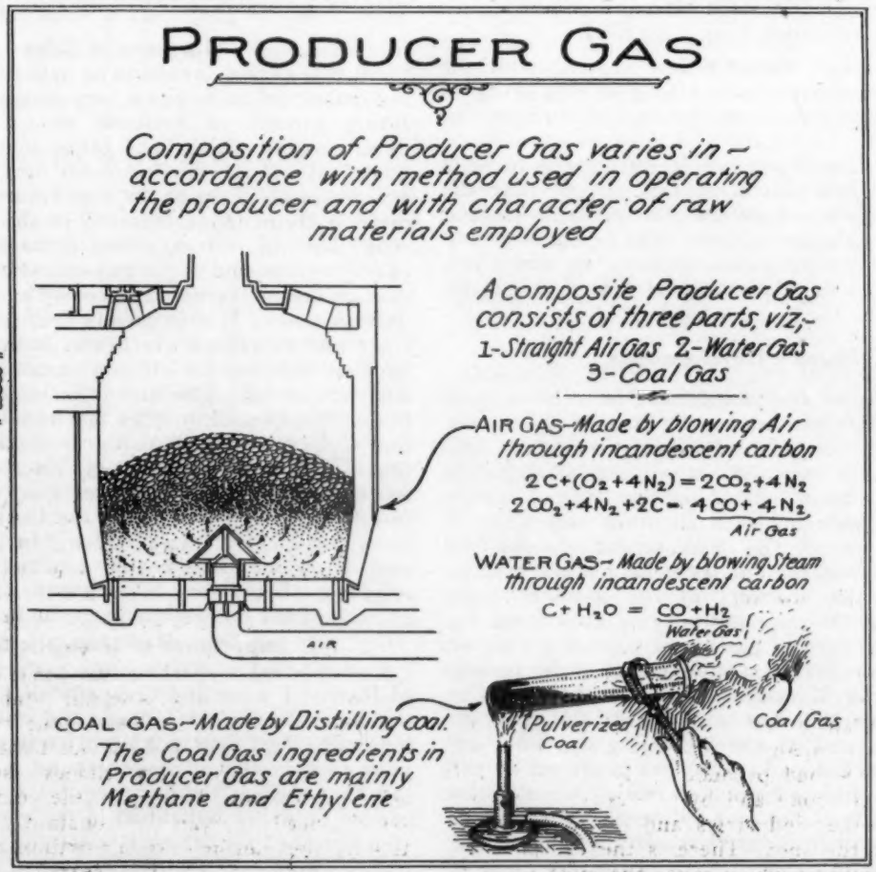
IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 145

Manufactured Gas

Composition and Use of Producer Gas

The composition of producer gas varies rather considerably, not only in accordance with the character of the fuel that is used in the producer but also in accordance with the manner in which the producer is operated. Thus, it may be possible, under certain conditions, to operate the producer with the addition of a very small amount of steam, and naturally a gas that would be made in this fashion, would contain considerably less hydrogen and carbon monoxide than a gas made in a producer in which a considerable amount of steam was used. The purposes of the addition of steam in the manufacture of producer gas is not essentially to increase the thermal value of gas but rather to prevent the fusion of the ash on the grate which always results in a disrupted operation of the machine and also in injury to the grate. It is understandable that the blowing


PRODUCER GAS
Composition of Producer Gas varies in accordance with method used in operating the producer and with character of raw materials employed
A composite Producer Gas consists of three parts, viz;-
1-Straight Air Gas 2-Water Gas
3-Coal Gas
AIR GAS-Made by blowing Air through incandescent carbon
$2C+(O_2+4N_2)=2CO_2+4N_2$
$2CO_2+4N_2+2C=4CO+4N_2$
Air Gas
WATER GAS-Made by blowing Steam through incandescent carbon
$C+H_2O=CO+H_2$
Water Gas
AIR
COAL GAS-Made by Distilling coal.
The Coal Gas ingredients in Producer Gas are mainly Methane and Ethylene
Pulverized Coal
Coal Gas

of steam through the bed of incandescent coal in the producer results in reactions of the type that take place in the water gas generator.

Furthermore, the depth of green coal and also the character of the fuel above the incandescent load, also determines to a large degree the composition of the gas. For it is understandable that under certain conditions a considerable amount of methane gas may be distilled out of this green coal together with other higher hydrocarbons which give the producer gas, to a certain degree, the characteristics of coal gas.

Thus, it may be said that producer gas consists of three different gases. First, there is the straight producer gas which is simply a mixture of carbon monoxide and nitrogen and which is made by blowing air through the incandescent coal. Secondly, there is the water gas constituent which is derived from the reaction of steam and the incandescent fuel. Thirdly, there is the coal gas constitutent which is obtained by the action of the hot gas passing through the bed of green coal.

All three together give what is known today as producer gas.

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(Continued from page 638)

be on the market within a few months which is said to be far superior to anything in the electrical field in simplicity of construction and economy of operation.

It looks as though you people were going to be in a very sweet position with this. Now that the electric industry has done the pioneer work—selling the idea and working down the sales resistance—you are entering the field with a superior appliance just as they entered the lighting field after the gas industry had done the pioneer work.

Notable Developments

During the past ten years there have been some notable developments along the line of more economical production and distribution of gas. One thing that stands out in my mind particularly is the work that has been done along the lines of correlating the gas industry with all other industries. I do not mean merely the development of industrial gas burning apparatus but something much broader involving all the contacts of the industry right through from the shipment of raw coal from the mine to the delivery of gas at the customer's meter. You have a wonderful example of this in the various activities of the Massachusetts Gas subsidiaries at Everett. The central unit is, of course, the great by-product coke plant of the New England Fuel and Transportation Company. The gas produced by this company is a finished product ready to go in the mains; but in its coke and by-products it has raw materials for other industries and these industries are located on the spot. There is the tar plant of the Barrett Company which takes the most important by-product, while the coke goes partly to the water gas plant of the Boston Consolidated Gas Company and partly to the blast furnace of the Mystic Iron Works. Additional economics in the handling of coal operations are made possible through the joint use of the equipment for this purpose by the coke plant and by the New England Coal and Coke Company, which also handles the sales of the small sizes of coke.

High Pressure Gas Transmission

Another recent development of importance has been the high pressure transmission of gas which promises to make possible for the gas industry very much the same sort of thing which high tension transmission of electricity has done for the electric industry. Huge plants can be built at strategic locations for the most economical production and the gas piped through high pressure mains to many different communities. Out in Illinois, the Western United Gas Company has a large system of this kind in successful operation and there are many other similar systems contemplated in various parts of the country. Furthermore, even outsiders like myself are hearing faint rumors of certain fundamental developments in the manufacture of gas which should eventually substantially reduce production costs. I have only the haziest notion of what the idea is but the name that is given to the process "the complete gasification of coal" has a very interesting sound.

Increase in Sales

All this development in the field of gas production and industrial sales has a very direct bearing on the future growth of domestic gas sales. The great developments which have taken place in the industrial field and the much greater developments which are definitely coming in the future are going to mean a tremendous increase in the volume of gas sold. This, of course, means a much larger volume of production, and in the gas industry, increased production means increased efficiency and decreased production costs. It also means decreased distribution costs and decreased overheads, both because it will be possible to use present equipment more intensively and because gas, like any other commodity, can be more cheaply sold in large blocks than small. Eventually, decreased costs can only mean one thing and that is decreased rates. It will also probably mean a more scientific basis for rates than the present flat rate, something more along the lines of the present basis for electric rates which fits the rate to the cost of service. I do not have to tell you gentlemen anything about what lower rates will mean to the growth of the domestic end of the business.

Importance of Domestic Sales

I want to say a word about what it is in the opinion of Harris, Forbes and Company that constitutes the real basis for the permanence and stability of the gas industry. This does not lie in your huge plants and your vast system of underground mains, but in the fact that the gas industry renders a service which is needed by every individual in the community, a service the need for which is constantly growing. The stability does not lie in the growth of industrial sales. There are going to go up in years of general activity and prosperity, but they are coming down again in years of depression. The real backbone of the industry is now, and is always going to be, the domestic sales.

YOUNG GIRLS' COOKING CLASS

MISS CORBET, of the South Chicago Store of the Peoples Gas Light and Coke Company, has put in force an original idea in having a young girls' class every Monday and Thursday morning, which is increasing the crowds. The girls work, in teams practising canning, under Miss Corbet's able instruction and vie with each other as to which is the "best man," thus creating a friendly spirit of competition.

In the afternoons of these two days most of the mothers come to see the results of their daughters' progress in the culinary art, thus assuring us good attendance.

Miss Corbet's combination of charming personality and domestic science efficiency is sure making old South Chicago sit up and take notice.

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WHEN THE WIFE IS AWAY?

SEVERAL requests from men for a class just for them came to the Home Service Department, Providence Gas Company, Providence, R. I.; their families were away and they had to get breakfast and supper dishes for themselves—couldn't we help them out? We could, and told them we would plan something for them. Five noon-time classes, lasting half an hour each, were mapped out, covering breakfasts, suppers, simple menus and camp cookery. Recipe sheets were prepared and the dishes made on the platform with minute instruction as to their preparation and why they are good. The men seemed intensely interested and asked questions throughout the lessons. All went up to the platform to see the finished dishes.

As an outgrowth of these classes the department was asked to give three half-hour classes for the men who set up the ranges, teaching them how to use the broiler, the oven, the surface burners and how to care for the range. These were in the morning and were cooking lessons, too.

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HOME SERVICE IN NEW JERSEY

MISS LUCILE HENSHAW, Home Service Director of the Essex Division of the Public Service Electric and Gas Company of New Jersey, has started a course of sixteen lessons in the Y. W. C. A. of Orange.

The same course of sixteen lessons has been started in the Southern Division of Public Service by Miss Catherine Cahalan, who is in charge of the work in that Division.

Each Wednesday afternoon Miss Margaret Gallatin, who is in charge of the Home Service work of the Hudson Division of the Public Service, conducts her lessons on food preparation and meal planning.

All of these classes have proved very popular and each week new members are enrolled.

Miss Helen Hess, of the Home Service Department of the same company, did an interesting piece of work at the opening of the new Eastside High School in Paterson, when she gave a lecture and demonstration to members of the various clubs of Paterson and town's people, who were invited to the opening of the new auditorium in the high school.

At Hightstown, N. J., a newly-opened territory of the Public Service Gas Company, one in which gas has not been used before, Miss Catherine Cahalan held a most interesting lecture and demonstration. This activity on the part of the Public Service was greatly appreciated by the mayor of Hightstown and the residents, and is sure to make good friends for Public Service, as well as encourage the use of gas through educational instruction.

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HOME SERVICE TEACHES HOW TO REDUCE GAS BILL

MISS RUTH SOULE of the Home Service Division of the Brooklyn Union Gas Company, recently told the Mother's Club of P. S. 70, in Brooklyn, N. Y., in confidence, on how to reduce their gas bills.

"Every cubic foot of gas," said Miss Soule, "should be made to do as much work as possible. The use of the simmering burner, the covering of vessels, and the use of a low flame whenever possible, will reduce your gas bill."

She also advised them as to the care of the gas stove. "The burners," continued Miss Soule, "should be boiled twice a year in a solution of washing soda in water. The air shutters should be adjusted so that the flame burns quietly, and is of clear blue color. A cloth with a shall amount of stove oil should be rubbed over the burners each evening."

How Best to Cook Meals

Miss Soule then told about the best method of cooking meals. She said, "The importance of baking by temperature is generally recognized, for in addition to saving gas, it practically insures a good

product. We find that nearly all failures in baked foods are due largely to the incorrect use of ovens."

"The most satisfactory method of baking by temperature is, of course, in the controlled oven. In this tpye of oven, a wheel is set at the desired temperature, and the gas turned on full and lighted. The full supply of gas continues until the desired temperature has been reached. At that point the gas is automatically cut down to a point which will keep the temperature constant. It is possible to leave the food in the oven, and come back at the time at which it is to be taken out. It is also possible to put an entire meal in the oven—soup, meat and vegetables, and after setting the wheel at a low temperature, leave for several hours, returning to find the dinner ready to serve."

"If one does not have a controlled oven, a baking thermometer will be of great help. This will necessitate controlling the temperature by hand, however, and one cannot leave food unwatched."

In conclusion, Miss Soule told of the desirability of many other gas-burning appliances for the modern home, such as water heaters, space heaters and laundry equipment.

SPREADING THE GOSPEL OF GAS

MRS. Luella M. Fisher of the Eriez Stove & Mfg. Co. of Erie, Pa. has been spreading the story of the use of gas in the home through lectures to high school pupils. In her talks Mrs. Fisher took the school children, literally speaking, through the gas plant by means of diagrams; explaining each method of manufacture and distribution, through the gas service mains into the home. The intricacies of the meter were described thoroughly; how it operates, how it is read, etc., and how the service piping enters the house, and the necessity of suitable pipes of proper dimensions. The various appliances in which gas is used for cooking, heating, lighting, etc., such as gas ranges, house heating boilers, water heaters and meters were set up in front of the class in full operation and for ready reference.

Mrs. Fisher recently gave a number of these lectures, both day and evening, to various classes in a Brooklyn, N. Y., high school (which were largely attended by a very appreciative audience). The Kings County Lighting Co. generously co-operated by installing the appliances for the display.

Teaching the Housewife the Proper Use of Gas*

C. B. Truesdell

The Union Gas & Electric Company

ONE of the important duties of the Home Service Division of the Gas Commercial Department of The Union Gas & Electric Company is that of giving explicit instructions to domestic gas consumers so that they can obtain the maximum amount of heat from the gas supply furnished to their homes.

Interesting information is gleaned from exhaustive surveys as shown by data compiled during the year ending May 31, 1926. One of the outstanding features is lack of knowledge on the part of the majority of householders of the efficient use of gas, principally through failure to adjust ranges, water heaters, and other heating appliances properly. The inspections also show that often the improper installation of equipment has prevented the economical use of gas.

By correcting these evils, employees of the Home Service Division, have enabled thousands of housewives in Greater Cincinnati to obtain better service.

Since the organization of the Department May 13, 1924, 80,558 gas appliances have been inspected. Of this number 43,047 required adjustment.

Inspection of Appliances

Frequently it is found, when making inspections, that because of the condition of the appliances proper adjustments cannot be made. This is due principally to the fact that the equipment is antiquated, and therefore, is extravagant in the consumption of gas.

When such cases are discovered the purchase of new equipment is recommended.

For example, one range was found to have been in use without adjustment or proper attention for nearly twenty years. The burners were corroded and the pipes showed a leakage. Even when not in use the range consumed gas which escaped through insecure piping.

Gas Bill Reduced

Upon the recommendation of one of the inspectors of the Home Service Division, the owner purchased a modern range and was surprised to find that her gas bills were considerably lower than when she used the old range. She also discovered that her food cooked faster because a greater amount of heat was obtained from the new, properly adjusted burners, than from the old burners clogged with rust and dirt.

Last year $60,000 worth of appliances was sold through this medium, and from reports during the

* From Hail Columbia.

first half of the present year sales of gas equipment in excess of $100,000 will be made in 1926.

A gas flame produces the greatest amount of heat when it is clear blue in color. Any other color denotes improper adjustment or clogged burners. This is especially true if the flame is pure yellow or has a yellow tinge.

It is estimated that hundreds of thousands of cubic feet of gas are wasted annually through the use of improperly adjusted and inefficient appliances. This is being eliminated to a great extent through the efforts of the men in the Home Service Division.

Handling Inspections

Cincinnati is divided into six districts to facilitate the handling of this work. Men are assigned to these districts to make the inspections. These six subdivisions of the Cincinnati territory were made from three original divisions known as the East, West and North districts.

The Home Service Division forms an integral part of the Gas Commercial Department, operating in conjunction with the Industrial Gas Engineers Division, which departments are all operated under the supervision of E. R. Rothert, Manager of the Gas Commercial Department.

Besides the many thousands of inspections and adjustments made to gas appliances by the Home Service Division, gas ranges, water heaters and other gas appliances are sold by the men; old mains checked for refunds; new gas main extension surveys made; contracts for main extensions executed, and special work performed.

Here is a summary of work accomplished by the Home Service Division, from June 1, 1925, to May 31, 1926.

Inspections		34,324
Adjustments		19,431
Ranges	Sold	452
Water Heaters	"	44
Water Heater Outfits	"	75
Space Heaters	"	160
Grates	"	30
Incinerators	"	10
Furnace Burner Sets	"	65
Gas Furnaces	"	44
Laundry Stoves	"	39
Clothes Dryers	"	3
Time-O-Stats	"	8

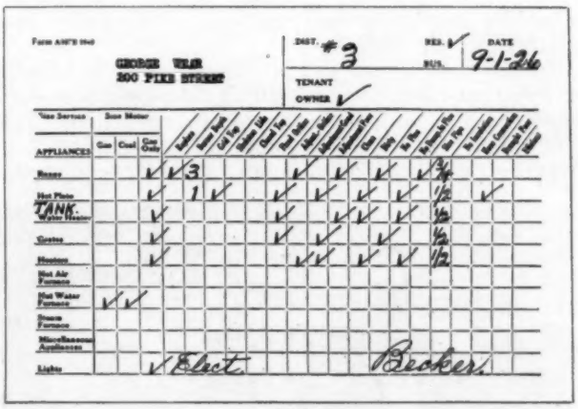
Inspection Report

Accompanying this story is a reproduction of a report of an inspection made at the home of George Wear, in the form of a card which is kept on file in the offices of the Gas Commercial Department.

Peter Becker, whose name is written on the lower right hand corner, made the inspection. The report shows that the burner depth of the range in use in this house was three inches. The proper depth is not more than 1½ inches. The check marks in the adjoining columns indicate that the burner adjustment was poor; the burners were dirty and no damper was installed in the flue connections. Consequently, the purchase of a new range was recommended.

The second item shows that a hot plate was in use, connected with a hose. This being a violation of the rules of the Board of Insurance Underwriters, the owner was advised accordingly.

The third item indicated that a hot water heater was used without a flue connection. The owner was advised to install one. Also, the adjustment was poor, which was remedied by the inspector.



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The Inspection Report Card

Other Items

The fourth item shows that a gas grate, which was improperly adjusted, was fixed.

According to the fifth item a space heater was being operated without proper flue connections. The owner was advised to remedy this.

The sixth item indicates that a coal furnace with gas burners was used. The inspector, after a careful survey, recommended a specially designed gas furnace.

The last item shows that the house is being served with both gas and electricity. After an inspection this installation was approved by the inspector.

It has been exceedingly gratifying to the Home Service Division that in practically every instance, where defects were pointed out, the customers readily acceded to the recommendations for the installation of new equipment.

Improper adjustment of burners has been the chief cause leading to the failure to obtain the highest amount of service from the gas supply.

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A CORRECTION

In the article entitled "Welding and Cutting with City Gas" published in the November 13th issue, the price of oxygen was indicated to be 4¼ cents on page 587. This should of course have been 1¼ cents.

The Gas Meter in a Window Display

The meter and its parts made interesting display material

C. A. Learned

District Manager, The Connecticut Light & Power Co., Meriden, Conn.

THE accompanying photographs show the gas meter exhibit that The Connecticut Light and Power Company recently staged in the display windows of their Meriden office. The volume of material that composed this exhibit was such that it was found necessary to use two of the display windows and to divide the exhibit between iron meters and tin meters.

In the iron meter exhibit were complete meters of different sizes, sectional meters showing construction and a glass paneled meter in operation. Full sheepskins both bark tanned and chrome tanned, together with cut diaphragms, formed diaphragms

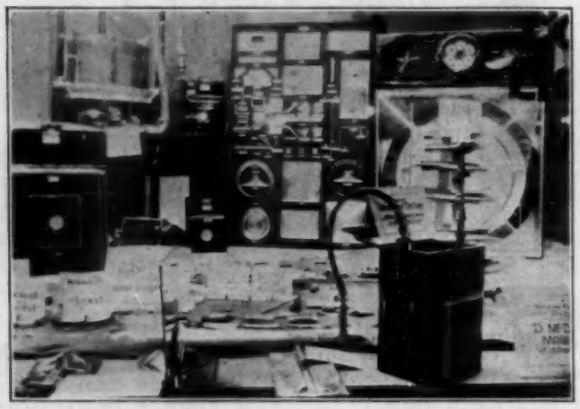


Exhibit Showing Various Parts of Meters

and diaphragm forming blocks illustrated diaphragm production. All of the component parts of an iron meter were spread out in a manner to further explain the construction of this type of meter.

Tin Meter Exhibit

The tin meter exhibit occupied a large display window and centered around the 300 lt. MacDonald meter purchased in 1876 that had passed some 12 million cu. ft. of gas in various local factories and on its last removal test was within 1 per cent of correct. On previous removal tests it showed nearly equally good performances and in its whole life of 50 years, has only been repaired twice. The meter front and back plate were removed and replaced with glass and lights were concealed in the meter to illuminate the diaphragm compartment of the valves. A large mirror was suspended over the meter at an angle to permit people to see the movement of the valves. A fan blower was concealed behind the mirror and connected to it with 3-inch pipe to operate the meter at about normal speed.

Glass paneled display meters were placed close to each of the two large windows and were connected to large burners so that people could readily observe the motion of the valves and diaphragm.

A new 5 foot copper bell prover connected to a meter with check caps and other prover accessories together with a large display board on which were mounted all of the component parts of a tin meter, formed the background for this display.

Evolution of the Diaphragm

The evolution of a diaphragm showing all stages of production from tin strip and uncut hide to finished oiled diaphragms, occupied a space the full width of the window. Each phase of diaphragm production and the material entering into its construction were suitably marked with small cards.

To impress on people the fact that their meters were tested with accurate measuring devices an en-

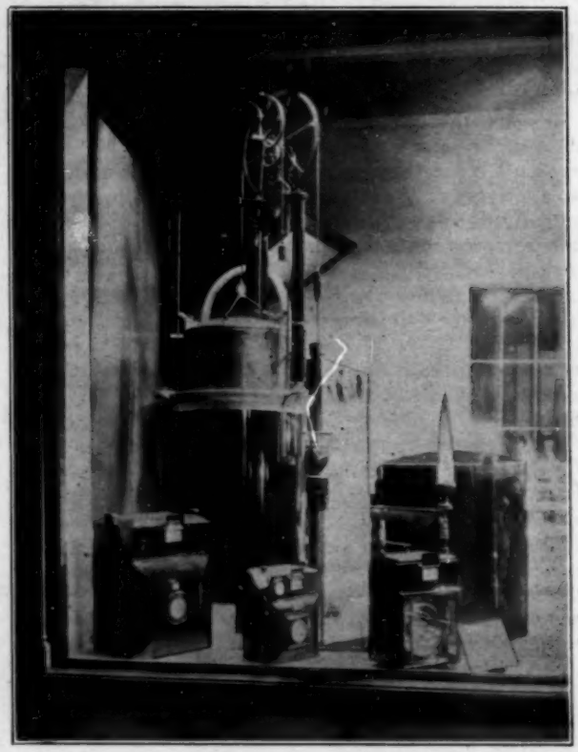
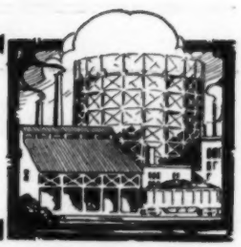


Exhibit Showing Meter Testing Apparatus

larged cut of a cubic foot bottle was shown with an explanatory card stating that it was tested and sealed by the Bureau of Standards and that it was used to calibrate the meter provers with which consumers' meters were tested.

Pyramids of oiled and un-oiled diaphragms of different sized meters in various stages of construction that would assist in explaining how a meter worked, meter repair materials and repair tools formed the balance of the tin meter display.

NEWS OF THE GAS INDUSTRY



Metermen's Course at Iowa State College

Sixth Annual Short Course to Be Held in December

The Sixth Annual Gas Metermen's Short Course of the Midwest Gas Association will be held on December 7-8-9-10, at the Iowa State College, at Ames, Iowa.

The plan of the course this year is along the lines similar to previous courses and will consist of practical instruction in repairing tin and iron case meters, and discussions of various meter and distribution problems.

The practical instruction will be under the direct supervision of George A. Lane, superintendent of meters, of the Peoples Gas Light & Coke Co., Chicago. Mr. Lane will give all the lectures and demonstrations on repairing of tin meters, and will have as assistants a number of prominent meter men from the Midwest Gas Association. E. J. Werthmann, meter shop foreman of the Peoples Light Co., Davenport, Iowa, will give the lectures and demonstration work on iron meters.

Each meter repair man attending the course will be required to pass an examination on the work covered in the lectures and demonstrations and will be required to actually perform the work of repairing meters at the bench.

The Subjects

Among the subjects to be covered by the distribution superintendents, engineers and managers in attendance at the course will be: "Meter Installation," "Gasket and Gasket Material," "Patented Connections," "Meter Cocks—Meter Sealing," "Care and Handling of Meters from Customer's Premises to Shop and from Shop to Customer's Premises," "Paints and Painting of Meters," "Making a Pressure Survey—How to do it and how to use the information obtained," "House Governors," "Unaccounted for Gas," "Gas Department Records," "Relations of the Gas Department Employee to the Public."

It is anticipated that this meter school will be better than any of the previous ones, due to improvements in methods of grading and in improved facilities for the work.

The Midwest Gas Association in co-operation with the Iowa State College instituted the first Gas Metermen's Short Course and have been among the leaders in this work since its inception.

Borough Gas Co. Workers Honored

Brooklyn, N. Y.—The Brooklyn Borough Gas Company, of which Mary E. Dillon is president, recently decorated 94 employees with service pins, covering from five to over twenty-five years of service.

The company was organized in 1898, and at that time there were not more than twenty-five in the organization. Six were given pins representing over twenty-five years of service and seven for over twenty years. There were ten people who served over fifteen years and fourteen over ten years.

The remaining fifty-six pins were for five years.

The ninety-four included representatives of every department, from president to street laborer. The pins bear a flaming torch and are solid gold with one star representing five to ten years' service, two stars for ten to fifteen years, and three for fifteen to twenty years. The twenty-year pins have a pearl and the twenty-five-year pins a diamond.

The company has more than 350 employees. Those edocated were:

Twenty-five Years—S. Newman, L. N. Perry, J. Pritchard, F. Ruggiero, R. Taylor, P. Wurtenberger.

Twenty Years—Miss M. E. Dillon, R. H. Anderson, J. H. Bailey, G. Dangman, H. J. Dillon, T. Fringo, R. Pezzallo.

Fifteen Years—Miss L. A. Galligan, Miss K. S. Mulhern, Miss M. A. Mulhern, A. Kaiser, H. Klippel, F. Lehman, J. Martorello, E. Matthews, M. F. McDonald, G. Seiler, J. F. Zengel.

Ten Years—Mrs. M. E. Poit, Mrs. H. S. Steers, Miss E. A. Trueper, J. F. Dennis, J. F. Droge, J. E. Jones, B. Kaiser, R. B. Moller, T. H. Platt, J. M. P. Reilly, G. H. Stang, F. Stehman, A. E. Steers, Jr., A. Wolff.

Five Years—Miss J. Curren, Miss L. A. Dillon, Miss M. Hayes, Miss E. Held, Mrs. F. Holtzberger, Miss H. Irving, Miss A. Martin, Mrs. A. Monahan, Miss E. Reagen, Miss E. Spence, Miss R. Sweeney, D. Abboteillo, F. Aceto, J. Balzano, E. Byrne, F. Bahman, J. Campbell, W. Chandler, T. Cioffi, E. L. Connor, J. Daly, P. Danato, J. DeAmbero, C. Dillon, J. Ferrarro, F. Franjello, L. Frosch, J. Godsoe, M. Graziano, T. Grello, T. Justiano, J. M. McDowell, J. McGee, C. Mulrean, J. Nashpiolo, C. Palma, A. Pavio, L. Petrosino, B. Pfeifer, J. Raffonie, J. J. Reilly, H. Rein, J. M. Ropiecki, J. Rotondo, P. Ruggiero, J. Saberise, D. Scanlon, H. L. Scherer, J. Sharkey, J. F. Sherwood, G. Spielman, J. Stites, J. J. Taunton, S. Tomaise, F. X. Wardman and J. Aceto.

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F. Sartorius, Secty.-Treas. United Natural Gas Co. Retires

Franklin, Pa.—A dinner was given F. Satorius, secretary and treasurer of the United Natural Gas Company and the Mars Company, who retired recently from active service with these companies. He was associated with the same business interests since June 3, 1883, or for a period of over 43 years continuously.

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E. A. Angley Heads Gas Co.

Salt Lake City, Utah.— Evan A. Angley, general superintendent of the Utah Gas and Coke Company, has succeeded George R. Horning as general manager of the firm.

Mr. Angley has been a resident here since 1909 and has worked for the local company for eight years. Mr. Horning has become general manager of the Southern Gas and Power Corporation of Chicago.

Own Your Home Show Planned for 1927

Rigid Rules to Govern Exhibitions

All building materials and equipment shown at the 1927 annual New York and Chicago "Own Your Own Home Expositions" must submit to a severe test before they are accepted by the management under a new policy laid down in each city.

The organization of these annual expositions is becoming more rigid each year, and certain manufacturers who are entirely reputable will not measure up to the high standards now required by the expositions. At the New York Ninth Annual Exposition to be held in Madison Square Garden, February 19th to 26th, 1927, and the Seventh Annual Exposition to be held in Chicago at the Coliseum, April 2nd to 9th, this plan will be known as an "Inspection Before Acceptance for Exhibition."

Court of Homes

"A Court of Homes," featuring an artistic grouping of a number of full sized homes built in the various accepted and proper materials, will be a feature of both expositions. "The Court of Homes" is being planned in a way that will interest architects and builders, as well as prospective home owners. The houses will be of concrete, masonry, brick, frame, stone and other materials that have demonstrated their worth, permanency and economy. The selection of the architectural designs and the actual construction will be supervised by architectural committees, composed of eminent architects.

New exhibit committees are being appointed to supervise the various divisions in the exposition that include home financing, planning, building, equipping, furnishing and landscaping. These exhibits are being assembled under the exposition "Code of Ethics" which bars all irrelevant displays, stunts and circus features, and which provides for all of the methods, materials, products and equipment that enter into the modern home. This "Code of Ethics" was drawn two years ago by the expositions, and some forty national trade organizations and associations, and it has been altered this last summer to bring it up to date with recent advances made in the home building field. This document is the constitution of the expositions and works for the protection of the thousands of prospective home owners who attend the expositions and the twenty-five or thirty trades represented by the exhibitors.

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Wyandotte Co. Gas Company Starts Share Drive

Kansas City, Kans.—W. H. McKenzie, general manager of the Wyandotte County Gas Company, has announced that all of the employees of his company are prepared to take part in another widespread customer ownership campaign to be held by subsidiaries of the Cities Service Organization in the middle west, from November 15 to November 22, inclusive. During this time, every employee of the Wyandotte County Gas Company will be authorized to take orders for Cities Service preferred stock.

Speaking of the continued success of their customer ownership campaign, McKenzie said:

"The public's capacity for absorbing good investments seems unlimited. We in this vicinity expect this time to receive orders for more shares of Cities Service preferred than we have in any past campaign.

"Any good, sound movement like customer ownership cannot help spreading. Investors are beginning to see beyond the idea of just 'buying stock.' They see that they actually become part owners of a great national public service organization, serving thirty cities of the United States with daily necessities of life—and they see that they benefit by the partnership.

"These investors talk it over with their neighbors, thus creating more prospective customers so that the number of Cities Service partners is continually growing.

"With 235,000 securities holders already in our organization, there is room for more because the growth of the public need of our companies' service requires steady growth of our organization."

Bridgeton Gas Light Co. Celebrates 69th Birthday

Bridgeton, N. J.—It was on the evening of November 15th, 1857, that Uriah D. Woodruff, president of the Bridgeton Gas Light Company, held his small son up and lighted the first gas light in the City of Bridgeton at 7:23 in the evening. At that time gas was only used for lighting but today gas is used for more than one hundred and fifty different purposes.

The company was organized on May 2, 1857, and elected the following officers and directors: Uriah D. Woodruff, president and treasurer; Charles E. Elmer, secretary; and Robert C. Nichols, Horatio J. Mulford and Benjamin Laning, directors. A little more than a month later, June 20, the present site on Water street was purchased and the contract for the erection of the plant was granted two days later to I. Ward and I. F. Starr, of Camden.

When the plant started to operate its capacity was 10,000 cubic feet, a vast difference from today when the holder capacity is 400,000 cubic feet. When the service started sixty-nine years ago gas was sold at the rate of $4.00 a thousand feet and during five years gas was only supplied at night. In 1864 the price of gas went up one dollar, feeling the effects of the Civil War.

Mr. Woodruff, the president, passed away on March 12, 1873, and to his position was elected Robert C. Nichols. The late Benjamin F. Harding was elected superintendent and treasurer at this time. Mr. Nichols died ten years later and Benjamin Keen became president. On January 20, 1886, William C. Mulford was elected a director and on October 26, 1888, was elected secretary and auditor.

All down through the history of the Bridgeton Gas Light Company appears well known Bridgeton family names. Jonathan Elmer was elected president of the company on January 16, 1888, and in the year 1892 Daniel Elmer assumed this office. All during these years the price of gas had been reduced until in 1894 the price was $1.35. On August 2, 1897, Daniel Bacon was elected president and Samuel P. Fithian a director.

It was in 1898 that Jacob B. Jones, the present superintendent, joined the company. The late Benjamin Harding had served twenty-five years with the company as superintendent and treasurer and it was also in this year that Joseph Ehrler became associated with the concern. At that time the plant consisted of three benches and three retorts, one bench of six retorts, three holders with a capacity of 85,000 cubic feet and eleven miles of street mains with 950 consumers and 500 gas ranges.

On December 12, 1912, Bloomfield H. Minch was elected president of the company and he is still in that position, having been re-elected a few months ago. On the date above Edward P. Bacon was named a director.

During 1913 the largest holder ever erected by the company was built with a capacity of 300,000 cubic feet and in 1916 it was again necessary to enlarge the plant. Today the company has a plant that sells gas cheaper than any other concern in the state. Today's plant has a capacity of 110,840,300 cubic feet output and feeds more than thirty miles of pipe line.

The present officers of the company are: Bloomfield H. Minch, president; Samuel P. Fithian, vice-president; William C. Mulford, secretary and auditor; Edward P. Bacon and Joseph P. Powell, directors.

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Minot Gas Company Purchases Site

Minot, N. D.—The Minot Gas Co., which was recently organized by C. I. Tenney of Des Moines, Ia., and his associates, has secured title to 2½ acres of land where the main plant will be erected.

Lucius Seymour Bigelow

His Life and Activity in the Gas Field

On October 31st, at Buffalo, N. Y., Lucius Seymour Bigelow, president and editor of the Gas Industry Magazine, went to his last rest. A strong personality, a man of high ideals, of kindliness of nature, of unbounded enthusiasm for his work in the field he had chosen, has passed away, his loss regretted and mourned by many.

Mr. Bigelow was born at Homer, N. Y., September 6th, 1859, the youngest of three sons of the Rev. Albert Bigelow, who was pastor of the Presbyterian church in Silver Creek, N. Y. The family later removed to Buffalo, where Lucius Bigelow grew to young manhood, and where the three Bigelow brothers founded a printing office. Mr. Bigelow enlarged the field of his activities by becoming connected with a large type foundry as manager for N. W. Ayer & Sons, national advertising directors, of Philadelphia, Pa., later becoming manager of the Engineering and Mining Journal.

With all of his training and development along the lines of printing, advertising and publishing, it was quite natural for Mr. Bigelow, when the time was ripe, to establish himself as an owner of a publication. This he did, when in 1903 he purchased the magazine "Light" published in the interests of the gas field, the name of which was later changed to The Gas Industry, by which name it is known today. A few years later Mr. Bigelow also purchased The Natural Gas Industry, then known by another title. Both of these publications are today flourishing and important supporters of their respective field. In addition to these two well known gas publications, a third publication came to life three years ago under the able hand of Mr. Bigelow, this to supply a need hitherto unfilled, that of reaching the merchant in the interests of gas appliance manufacturers, this third publication being known as "Household Appliances" Bigelow's Sales Extension Service.

National Commercial Gas Association

When Mr. Bigelow entered the publishing field in the interests of gas utilization, gas companies were making and selling gas for lighting and cooking, although the latter field was then new and undeveloped. Gas companies were not then the vast enterprises they are today. It was a young field and Mr. Bigelow recognized its infinite possibilities for development. To increase the use of gas, more gas appliances must be sold, and better gas appliances must be manufactured. A nation-wide co-operation only could bring this about. In 1905 through the columns of his magazine, Mr. Bigelow sent out the call for supporters of his plan to create a national commercial gas association, which through its efforts should set in motion forces through which the gas appliance manufacturing industry should receive recognition at the hands of gas companies as supplying the means through which gas sales should be increased. Twelve men of the industry answered Mr. Bigelow's call and joined him in his movement to create what came to be known as the National Commercial Gas Association. The first meeting of these original 13 members took place on May 12th, 1905. Mr. Bigelow wrote the prospectus for the organization, gave it its name, gave it unlimited support through his editorial columns, and served as its secretary during the years 1905,1906,1907,1908 and 1909. The National Commercial Gas Association, as all in the field know, was a magnificent success, and the part it played in the development of the commercial side is inestimable.

Eight years ago the National Commercial Gas Association was merged with the American Gas Institute, which was the organization of the engineering side of the industry, the consolidation organization being known as the American Gas Association, one of the largest public utility organizations in the country today.

Mr. Bigelow was elected an honorary member of the American Gas Association and also an honorary member of the New Jersey Gas Association. He was a member of many of the state gas associations, and was a well known and popular figure at their gatherings.

In the natural gas industry Mr. Bigelow was an outstanding figure, and an able supporter through his personal efforts and through the columns of the Natural Gas Industry of its activities and of the conventions and exhibitions of the Natural Gas Association. Mr. Bigelow entered this field of publishing in 1907, a year after the formation of the Natural Gas Association of America, and since that year has been a member of the association. During the early formative period of the association the Natural Gas Journal, as it was then known, was the official organ of the Natural Gas Association.

Mr. Bigelow was a member of the First Presbyterian church of Buffalo. He is survived by his wife, Mrs. Sarah Harris Bigelow, two daughters and three sons; Mrs. Storrs S. Waterman of Tacoma, Wash.; Mrs. Karl E. Wilhelm of Buffalo; Harris Storrs Bigelow, vice-president of the Periodicals Publishing Company; Allen Caryl Bigelow, secretary of the Periodicals Publishing Company; and Lucius Seymour Bigelow, Jr.

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Contracts Awarded

Contract has been secured by the Western Gas Construction Company, covering necessary equipment for the installation of by-pass process on the 9 foot set for the Cedar Rapids Gas Light Co., at Cedar Rapids, Iowa. This contract also includes the erection of this material.

Among recent contracts secured by the Western Gas Construction Company is one for a 15,000 cu. ft. gas holder for the Rochester Gas & Electric Corp., at Rochester, N. Y.

Contract has been awarded the Western Gas Construction Company for an oxide catch box, 22 feet wide by 42 feet long for the Minn. By-Product Coke Company, at St. Paul, Minn.

City's Utilities Recommended for Sale

Danville, Va.—The City Council of Danville has recommended to the voters the sale of the city owned electric and gas plants, operated by the municipality for thirty years, to the Appalachian Power Company after franchises controlling their operation had been read. December 19 was the date set for the referendum by the voters which will determine the question of sale.

The power company offers $2,750,000 cash for a thirty-year non-exclusive franchise providing for the operation of the gas plant for the franchise period. The electric light rate to domestic users would be the same as at present but lower to large users of power, the gas rates would be held unchanged for ten years. However, a provision is included in the franchise enabling the Appalachian Company slightly to raise gas and electric rates should coal advance fifty cents a ton at mine over $2 per ton for Pocahontas.

The outstanding feature of the council meeting was the admission that for the last five years the gas and electric plants together have been operated at a loss of over $100,000. The popular impression had been that all the utilities were paying propositions.

SMOOT CONTROL OF COMBUSTION
For Traveling Grate Stoker-Fired Boilers

Bulletin No. 28, sent out by the Smoot Engineering Corporation, 136 Liberty street, New York, explains very concisely the advantages of the Smoot Control as applied to various types of traveling grate stokers.

In the bulletin are illustrations of the Smoot Control apparatus connected to different makes of traveling grates; with records of performance shown by graphs, curves and charts, thus enabling the engineer to readily make comparisons.

The various units comprising the Smoot Control system used in accomplishing the results set forth in its pages, are pictured by means of halftone cuts wherein the details are easily discernible.

The Smoot Engineering Corporation will be pleased to send Bulletin No. 28, to any engineer on request.

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Botfield Refractories Co. Appoints Distributors

Philadelphia, Pa.—Botfield Refractories Co., manufacturers of adamant fire brick, adamant fire brick cement and refractory furnace linings, has recently appointed the following concerns as distributors for their products:

The Curtis Supply Co., Inc., Washington street at Perry street. Buffalo, N. Y.

The Waldredh Supply Company, 707-711 Cherry street, Des Moines, Iowa.

South Side Foundry & Machine Works, Charleston, West Virginia.

Empire Machinery & Supply Corp., 409-411 Water street, Norfolk, Virginia.

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"The New Way of Making Steam"

The legend quoted above appears on the envelope enclosing a handsome and well arranged catalogue descriptive of the La Mont Waste Heat Generator, equipped with the La Mont Duplex Steam Sealed Valve, utilizing the La Mont Combination of Inlet and Outlet Valves, and its application to Carburetted Water Gas, Blue Gas, Producer Gas and Oil Gas apparatus.

The manufacturers, The La Mont Corporation, 200 Fifth avenue, New York, claim that in the development of their Steam Generator, the laws of heat transfer have been combined and carried forward to a point which actually constitutes a "New Way of Making Steam," hence the title used.

They furthermore claim for the La Mont Waste Heat Generator, extreme light weight, very small space demand, perfect safety and high efficiency and is ideally adapted to the high pressures now increasingly in demand.

A copy of this catalogue is available to anyone interested, by addressing the La Mont Corporation.